CLAIMS

1. An automatic wind noise reducing circuit, characterized by comprising:

N number of audio channels (N is a positive integer equal to or greater than two);

first adder means for adding all of audio signals of N-1 number of audio channels, excluding one audio channel which is selected from the N number of audio channels;

first subtracting means for subtracting an added signal of the first adder means from an audio signal of the selected one of the audio channels, which is not added in the first adder means;

first extracting means for extracting a frequency band component of a wind noise signal with respect to each of the audio signals of the N number of audio channels in a preceding stage of the first adder means and the first subtracting means, or, with respect to an output signal from the first subtracting means in a subsequent stage of the first subtracting means;

first gain control means for controlling a gain of an output signal from the first subtracting means, whose output signal is band-limited by the first extraction means; and

second subtracting means for subtracting a signal, whose gain is controlled by the first gain control means, from the audio signal of the selected one of the audio channels,

wherein an output signal from the second subtracting means is set as an audio output of the selected one of the audio channels.

2. The automatic wind noise reducing circuit according to

claim 1, characterized by comprising:

N sets of the first adder means, the first subtracting means, the first extracting means, the first gain control means and the second subtracting means, the N sets being provided corresponding to the N number of audio channels,

wherein the selected one of the audio channels in each set is arranged so as not to overlap to each other.

3. The automatic wind noise reducing circuit according to claim 1 or 2, characterized by further comprising:

third subtracting means for obtaining a differential audio signal between arbitrary audio signals among audio signals of the N number of audio channels;

second extracting means for extracting a frequency band component of a wind noise signal from the differential audio signal from the third subtracting means; and

detector means, to which an extraction signal from the second extracting means is supplied, for generating a level detecting signal of the wind noise signal,

wherein a gain of the first gain control means is variably controlled on the basis of the level detection signal from the detector means.

4. The automatic wind noise reducing circuit according to claim 2 or 3, characterized by further comprising:

second adder means for adding all of output signals from the N sets of second subtracting means;

third extracting means, to which a signal from the second adder means is supplied, for extracting a frequency band component of the wind noise signal;

second gain control means for controlling a gain of an

output signal from the third extracting means; and

N sets of fourth subtracting means for subtracting an output signal of the second gain control means from respective output signals of the N sets of second subtracting means,

wherein output signals from the N sets of fourth subtracting means are set as audio signals of the N number of audio channels, respectively.

5. The automatic wind noise reducing circuit according to claim 4, characterized in that:

a gain of the second gain control means is variably controlled on the basis of the level detecting signal from the detector means.

6. An automatic wind noise reducing method, characterized by comprising:

a first adder process for adding all of audio signals of N-1 number of audio channels, excluding one audio channel which is selected from N number of audio channels (N is a positive integer equal to or greater than two);

a first subtraction process for subtracting an added signal of the first adder process from an audio signal of the selected one of the audio channels, which is not added in the first adder process, thereby obtaining a first subtraction signal;

a first extracting process for extracting a frequency band component of a wind noise signal with respect to each of audio signals of the N number of audio channels in a preceding stage of the first adder process and the first subtracting process, or, with respect to the first subtraction signal obtained in the first subtraction process

in a subsequent stage of the first subtracting process;

a first gain control process for controlling a gain of the first subtraction signal from the first subtracting process, which is band-limited by the first extraction process; and

a second subtracting process for subtracting the first subtraction signal, whose gain is controlled by the first gain control process, from an audio signal of the selected one of the audio channels, thereby obtaining a second subtraction signal,

wherein the second subtraction signal is set as an audio output of the selected one of the audio channels.

7. The automatic wind noise reducing method according to claim 6, characterized in that:

in the first adder process, obtaining N number of the added signals, in which different selected ones of the audio channels are used so as not to overlap to each other;

in the first subtracting process, subtracting respective ones of the N number of the added signals obtained in the first adder process from corresponding audio signals of the audio channels, which are selected so as not to overlap each other, thereby obtaining N number of first subtraction signals;

in the first extracting process, performing band-limitation so as to set each of the N number of first subtraction signals as a frequency band component of a wind noise signal;

in the first gain control process, controlling gains of each of the N number of first subtraction signals that are band-limited;

in the second subtracting process, subtracting respective ones of the N number of first subtraction signals, whose gains are controlled in the first gain control process, from corresponding audio signals of the N number of selected audio channels, thereby obtaining N number of second subtraction signals; and

setting respective ones of the N number of second subtraction signals as corresponding audio outputs of the N number of audio channels.

8. The automatic wind noise reducing method according to claim 6 or 7, characterized by further comprising:

a third subtracting process for obtaining a differential audio signal between arbitrary audio signals among audio signals of the N number of audio channels;

a second extracting process for extracting a frequency band component of a wind noise signal from the differential audio signal from the third subtracting process; and

a detector process, to which an extraction signal from the second extracting process is supplied, for generating a level detecting signal of the wind noise signal,

wherein a gain of the first gain control process is variably controlled on the basis of the level detection signal from the detection process.

9. The automatic wind noise reducing method according to claim 7 or 8, characterized by further comprising:

a second adder process for adding all of the second subtraction signals obtained in the second subtracting process;

a third extracting process for extracting a frequency

band component of the wind noise signal from the added signal added and obtained in the second adder process;

a second gain control process for controlling a gain of an extracted signal extracted in the third extracting process; and

a fourth subtracting process for subtracting the extracted signal, whose gain is controlled in the second gain control process from respective ones of the N number of second subtraction signals obtained in the second subtracting process, thereby obtaining N number of third subtraction signals,

wherein respective ones of the N number of third subtraction signals as audio outputs of the N number of audio channels.

10. The automatic wind noise reducing method according to claim 9, characterized in that:

a gain of the second gain control process is variably controlled on the basis of the level detecting signal from the detection process.